TACSM Abstract

Chronic Changes in Serum IL-6 and TNF-α Following 12 Weeks of Concurrent Resistance and Aerobic Exercise are Dependent on Exercise Mode and May Affect Adaptation

BRAD S. LAMBERT, JUSTIN P. DOBSON, and STEPHEN F. CROUSE (FACSM)

Applied Exercise Laboratory; Texas A&M University; College Station, TX

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ABSTRACT

PURPOSE: To examine physiological responses to concurrent resistance and land treadmill training (RT-LTM) compared to concurrent resistance and aquatic treadmill training (RT-ATM) and the chronic effect of each on serum TNF-α and IL-6 (cytokines associated with chronic inflammation, CVD, and skeletal muscle metabolism). **METHODS:** Twenty-six untrained subjects (M: n=13, 98.6±17.1kg, 182.2±6.2cm, 34±11yrs, F: n=13, 78.9±14.0kg, 165.1±5.1cm, 38±11yrs) were screened to assess VO_{2max}, body composition (DEXA), and strength (Lifts: leg press, chest press, leg curl, lat pull, leg ext, triceps push-down, biceps curl). Subjects were then randomized into 2 groups: RT-LTM (M=6, F=7), RT-ATM (M=7, F=6). Each performed progressive RT (2/wk, 3 x 8-12 @ 60%→~80% 1RM) for 12 wks. Both groups also performed 12 wks of aerobic LTM or ATM (60→85%VO_{2max}) respectively. ATM or LTM occurred immediately following RT sessions and in isolation on a 3rd day during the wk. Kcal/session: Wk 1-6 = 250→500 kcal/session, Wk 6-12 = 500 kcal/session. Blood samples were obtained in the rested state (>72h after last exercise bout) before and after training. Serum TNF-α and IL-6 was analyzed using a multiplex assay kit (Luminex®, Millipore®). A 2x2 Mixed Model ANOVA w/ repeated measures was used to examine absolute and relative changes in the independent variables listed in the table. **RESULTS:**

INDEP. VAR.	Lean Mass (kg)	Fat Mass (kg)	%Body Fat (%)	VO_{2max} (ml/kg/min)	Total Strength (lbs)	IL-6 (pg/dl)	TNF-α (pg/dl)
	BASELINE MEASUREMENTS						
RT-LTM	49.9 ± 3.7	35.9 ± 3.1	42.1 ± 2.5	29.9 ± 2.0	1457.4 ± 135.1	4.6 ± 1.6	7.1 ± 1.9
RT-ATM	53.1 ± 4.0	31.1 ± 2.8	37.0 ± 2.3	32.1 ± 1.6	1552.8 ± 145.9	4.6 ± 1.5	7.9 ± 1.5
	POST TRAINING MEASUREMENTS						
RT-LTM	51.0 ± 4.7†	34.1 ± 2.7†	40.1 ± 3.6†	35.8 ± 2.9†	1843.4 ± 201.1†	7.1 ± 1.6†	6.8 ± 0.5
RT-ATM	55.8 ± 4.6†	30.3 ± 3.1	35.6 ± 2.4†	35.8 ± 2.3†	2193.6 ± 251.3†	5.1 ± 2.7	6.6 ± 1.0†
	%Δ = Calculated From Each Individual Subjects Change From Baseline						

RT-LTM	2.6% ± 1.4^{†,a}	-6.5% ± 2.4^{†,a}	-5.8% ± 1.8^{†,a}	14.1% ± 2.3^{†,a}	21.3% ± 1.1^{†,a}	125.9% ± 36.6^{†,a}	-1.8% ± 6.0^{a}
RT-ATM	4.2% ± 0.9^{†,b}	-2.1% ± 1.6^{b}	-4.1% ± 1.5^{†,a}	4.5% ± 3.0^{†,b}	27.1% ± 1.7^{†,b}	28.1% ± 34.7^{b}	-13.0% ± 5.4^{†,b}

Values are means ± SE. %Δ = Individual change from baseline. Like letters = not significantly different between groups, †=Significant change from baseline within group ($\alpha \leq 0.05$).

CONCLUSION: Chronic RT-LTM and RT-ATM training elicit different effects on markers of chronic inflammation which may be related to differing health and fitness outcomes observed between our groups.